

## CLAIMS

What is claimed is:

1. A control system for a displacement on demand engine comprising:
  - an engine having a crankshaft;
  - a flywheel starter generator (FSG) that communicates
  - 5 with said crankshaft; and
  - a controller that communicates with said engine and said FSG and that initiates cylinder deactivation during engine operation, wherein said FSG adjusts torque output to said crankshaft to reduce engine speed variation during cylinder deactivation.
2. The control system of claim 1 wherein said FSG operates at a predetermined speed based on engine speed.
3. The control system of claim 1 wherein said controller adjusts current to said FSG to increase torque when engine sag is detected.
4. The control system of claim 1 wherein said controller adjusts current to said FSG to decrease torque when engine boost is detected.
5. A control system for a vehicle having a cylinder deactivation engine comprising:
  - an engine having a crankshaft;
  - a flywheel starter generator (FSG) that communicates
  - 5 with said crankshaft;
  - a power converter associated with said FSG; and
  - a controller that initiates cylinder deactivation during power generation, wherein said FSG operates at a steady state speed

and adjusts torque output to said crankshaft to reduce engine speed  
10 variation during cylinder deactivation.

6. The control system of claim 5 wherein said power converter further includes a DC to DC converter that communicates with a high voltage bus.

7. The control system of claim 6 further comprising a DC to AC inverter that communicates with said DC to DC converter and an outlet plug.

8. A method for operating a vehicle having an engine with a crankshaft and cylinders and a flywheel starter generator (FSG) that communicates with said crankshaft, comprising:

5 transitioning between an activated operating mode and a deactivated operating mode;  
sensing engine speed; and  
adjusting torque output to said crankshaft using said FSG to reduce engine speed variation caused by an unrequested change in engine speed in said deactivated mode.

9. The method of claim 8 further comprising operating said engine at idle speed.

10. The method of claim 8 further comprising operating said FSG at a steady state speed based on said engine speed.

11. A method of electrical power generation for a vehicle having a displacement on demand engine, comprising:

generating power using a starter generator that communicates with a crankshaft of said engine and consuming a first amount of fuel; and

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performing cylinder deactivation while generating power using said starter generator and consuming a second amount of fuel, said second amount of fuel being reduced from said first amount of fuel.

12. The method of claim 11 wherein the step of generating power includes supplying power from a high voltage bus to a DC to DC converter.

13. The method of claim 12 wherein the step of supplying power further includes supplying power from said DC to DC converter to a DC to AC inverter, which communicates with an electrical outlet.

14. The method of claim 11 wherein said starter generator includes a flywheel starter generator.

15. A method for operating a vehicle having an engine with a crankshaft and cylinders and a flywheel starter generator (FSG) that communicates with said crankshaft, comprising:

operating the engine in an activated mode;

5 providing a torque input with the FSG; and

transitioning from said activated mode to a deactivated mode based on said torque input by the FSG, said torque input by the FSG reducing the amount of torque needed from the engine cylinders.